

Feb. 28, 1939.

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2,148,661

THERAPEUTIC METHOD AND APPARATUS

Filed April 29, 1936

2 Sheets-Sheet 1

Fig. 1.

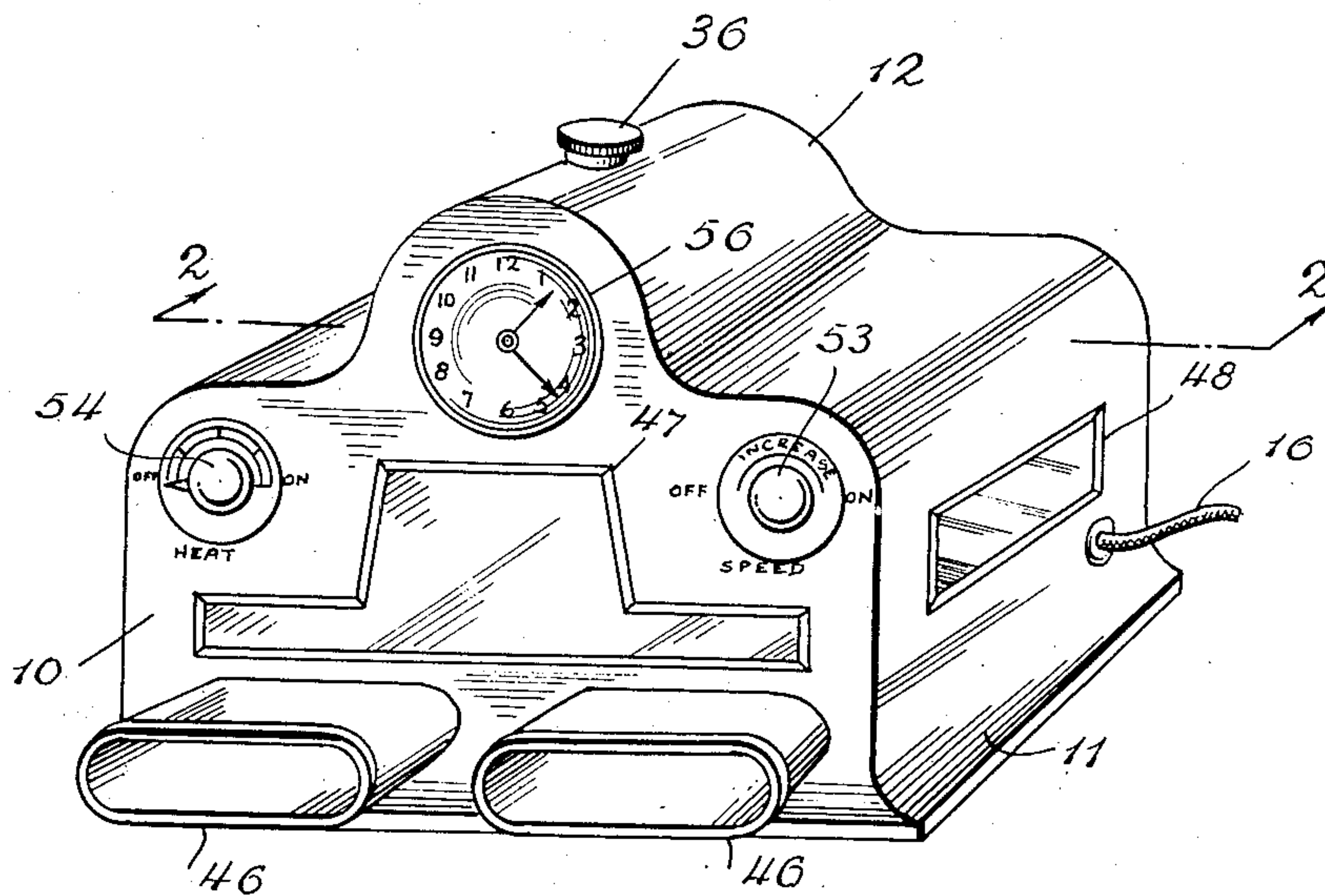
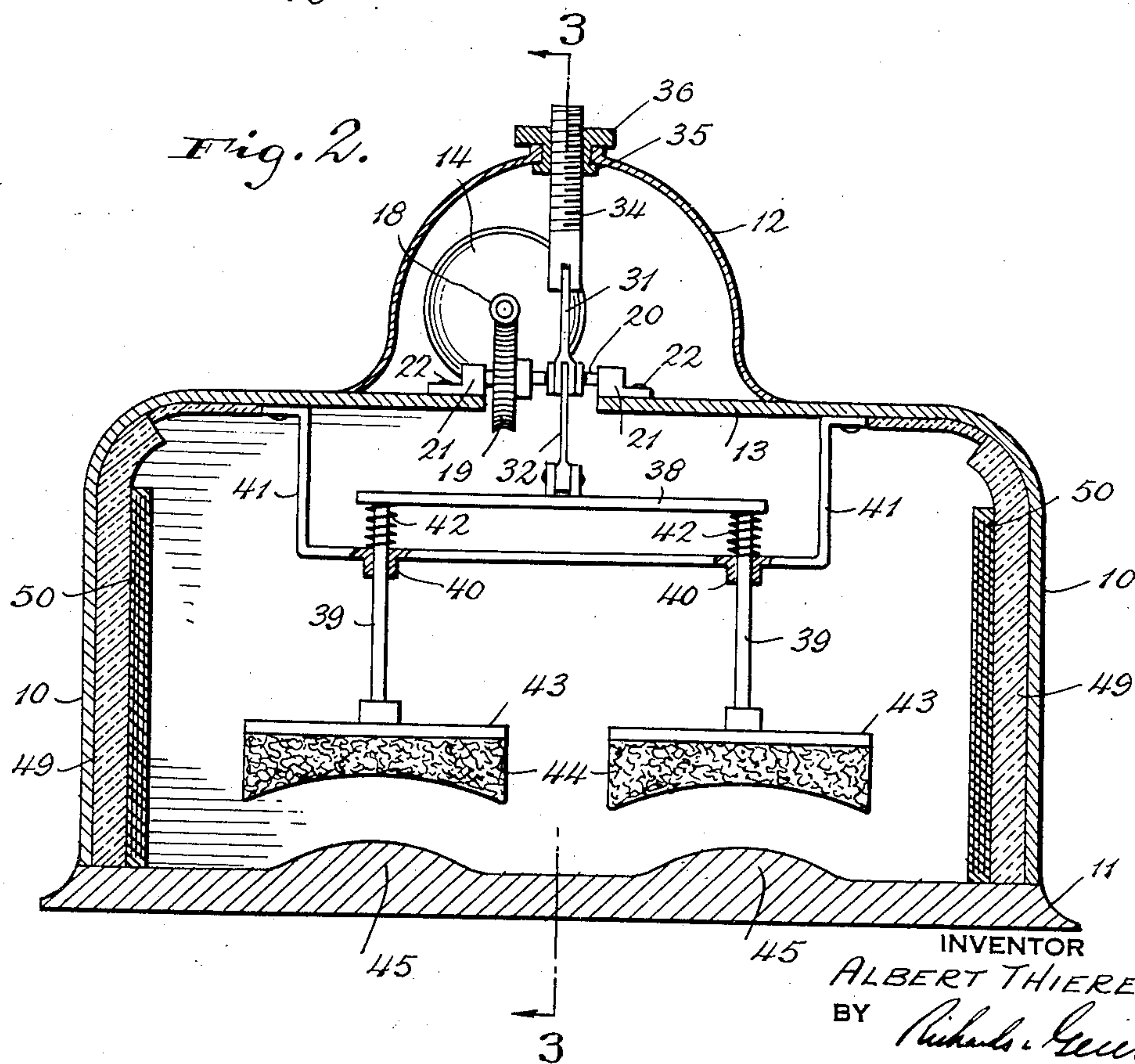


Fig. 2.



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Fig. 3.

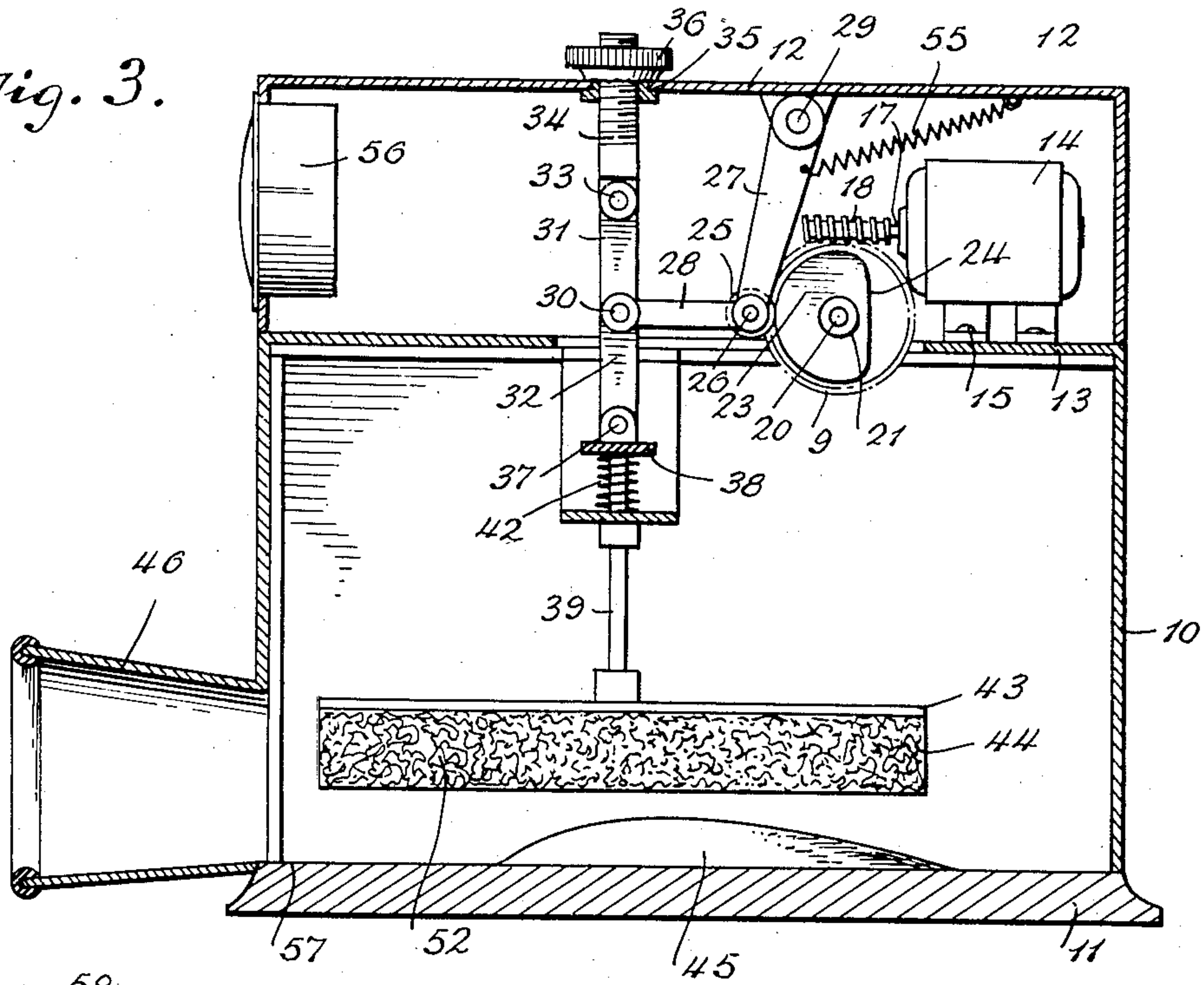


Fig. 4.

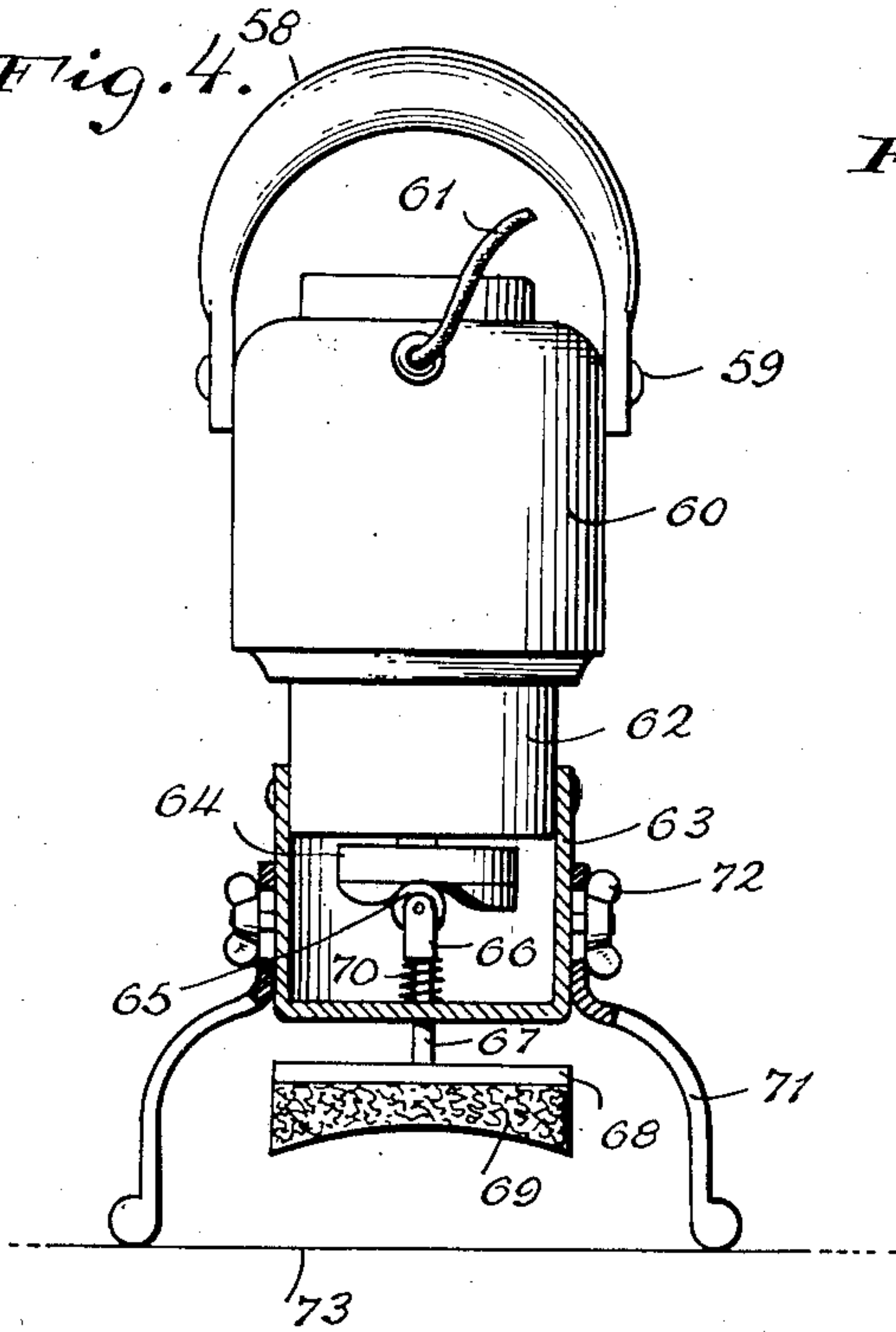
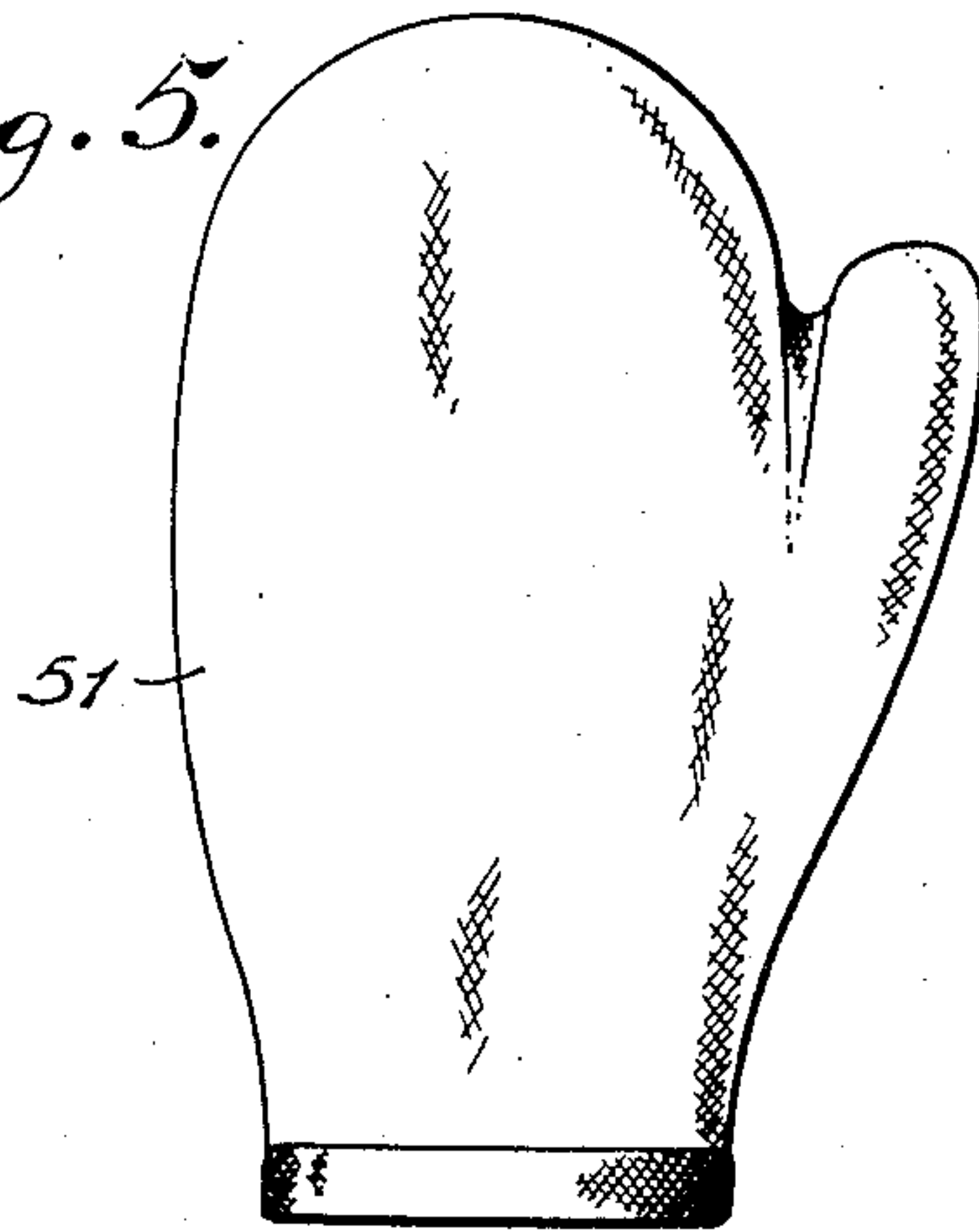


Fig. 5.



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## UNITED STATES PATENT OFFICE

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## THERAPEUTIC METHOD AND APPARATUS

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9 Claims. (Cl. 128—24.2)

The present invention relates to a method and apparatus to enable therapeutic treatment of the extremities and particularly the hands and feet and is particularly useful in various types of treatment of these portions of the body.

It is among the objects of the present invention to provide a method and apparatus by which the human extremities and particularly the hands may be subjected to a controlled manipulation and massaging of constant intensity and of adjustable periodicity at selectable temperatures and in the presence of predetermined medicinal agents.

Another object is to provide a compact and inexpensive machine for enabling a controlled manipulation and massaging of the hands and at the same time will enable a maintenance of a desired elevated temperature during the manipulating operation.

Another object is to provide an improved, light-weight inexpensive patting, tamping or massaging apparatus which is particularly useful in connect with the therapeutic treatment of the hands and which, at the same time, may be subjected to considerable handling without readily getting out of order and which may be readily repaired.

In accomplishing the above objects it has been found most suitable to provide a portable or fixed casing which may enclose the extremity to be treated, whether it be a hand, both hands, a foot or both feet and which will, at the same time support said extremity as to enable it to be subjected to a manipulating operation.

In one preferred form of the present invention, an electric motor is provided which drives a tamping or reciprocating pad having a resilient or pliable facing, such as of sponge rubber, which facing will be pressed down at desired frequency and with predetermined pressure upon the human extremity being treated.

The enclosure at the same time is preferably constructed so that selectable temperatures may be produced within the enclosure and so that sufficient heat will be available to aid the therapeutic treatment.

In one preferred form of the invention, the extremity for example the hand to be treated, is enclosed in a glove which is saturated with the treating chemical and then, while the heat is maintained in the desired degree, the hand is patted as a desired frequency or subjected to a desired pressure between the flexible or resilient face of the reciprocating member and a resilient or flexible backing member.

Referring to the drawings:

Figure 1 is a top perspective view of one form of casing which may be utilized to carry out the method of the present invention.

Figure 2 is a side sectional view upon the line 2—2 of Figure 1 upon enlarged scale.

Figure 3 is a side sectional view upon the line 3—3 of Figure 2.

Figure 4 is a side elevational view in partial section of an alternative embodiment.

Figure 5 is a view of a glove which may be utilized in the treating process.

Referring to Figures 1, 2 and 3, the casing 10 is provided with a base 11 to enable it to be positioned on a table or other supporting surface and preferably is made of rubber covered or insulated metal, or a plastic material such as Bakelite or either in part or whole of a heat resisting glass such as Pyrex to enable observation of treatment of the hands therein.

As shown in Figures 1 to 3, the upper part of the casing is provided with a dome 12 over the roof 13 (see Figures 2 and 3), upon which is mounted the motor 14 by the brackets 15.

The motor 14 may be connected by the conduit 16 (see Figure 1) leading to an external source of electrical energy.

The motor 14 is connected to drive the shaft 17 which is provided with the worm 18 meshing with the wheel 19.

The wheel 19 turns on the shaft 20 which is provided with the bearing members 21 riveted or bolted as indicated at 22 in Figure 2 to the support members 13. On the shaft 20 is fixed the cam 23 which has a depressed portion 24 which contacts with and actuates the follower or roller 25 associated with the pivot connection 26 between the links 27 and 28.

The link 27 at its upper end is provided with a bearing mount 29 depending from the top of the enclosure 12 and the link 28 is pivotally connected at 30 to the links 31 and 32, which together form a toggle connection.

The link 31 has a bearing mount at 33 upon the adjustable screw extension 34, which may be screwed into the nut 36 and be turned in the opening 35 in the dome 12 of the casing 10. The nut 36 enables adjustment of the toggle 31—32.

The thumb nut 36 in the manner to be described enables exact and careful regulation of the throw of the reciprocating massaging element and the pressure which it applies to the hand being treated.

The lower link 32 is pivotally connected at 37 to the transverse member 38 which carries the



shafts 39. The shafts 39 have bearings, as indicated at 40 on the bracket 41 and between the bracket 41 and the transverse element 38 are provided the return coil springs 42 reacting between said bracket 41 and member 38.

At the lower end of the arms 39 upon the plates 43 are carried the sponge rubber contact portions 44 which may also be made of other flexible materials.

The base 11 of the casing 10, as indicated best in Figures 2 and 3 carries resilient supports 45 for the hand or hands which may be inserted into the casing 10 through the front funnel like openings 46 (see Figures 1 and 3).

As indicated in Figure 1, heat resistant glass window openings may be provided at 47 and 48, to enable ready observation of the treatment.

The interior of the casing 10 is insulated as indicated at 49, by suitable materials such as asbestos, and carries on its face an electrical heating resistance element 50 which will generate sufficient heat to maintain desired temperature within the casing 10. If desired, the openings 46 may be provided with rubber linings and other parts of the casing may also be plated with rubber so as to insulate the apparatus and prevent undue heating thereof.

In operation the hands are encased in the mitten 51 of Figure 5 which is suitably impregnated with a desirable medicinal material, the glove being most desirably impregnated with an unctuous or any readily flowable fluid which will be elevated to a desired temperature by the internal temperature of the casing 10 controlled by the heating device 50.

The hands encased in the gloves may rest upon the resilient peaks 45 which may take the form of rubber pads or flexible members, the peaks 45 forming themselves to the shape of the hands indicated by dotted line at 52 in Figure 3, so that the hands will be in proper position to be acted on by the reciprocating pressure elements 44.

Then, the knobs 53 and 54 on the front of the casing 10 of Figure 1 are turned so as to start the motor 14 and to initiate heating of the resistance element 50.

The knob 53 will enable a convenient adjustment of the speed of the frequency of pressure application to the hands 52 while the knob 54 will enable convenient regulation of the internal temperature of the casing 10.

The motor 14 upon being initiated into operation by the knob 53 will rotate the worm 18 which will turn the wheel 19 and the cam 23.

The cam 23 will reciprocate the lever 27 through the roller or follower 25 which will reciprocate the link 28 and will thereby open or close the toggle formed by the links 31—32.

In the position shown in Figure 3 the toggle will be in extreme extended position pressing the sponge rubber or other flexible pad 44 firmly and with substantial pressure against the hand 52 resting upon the flexible or rubber elevation 45.

This pressure will be maintained as long as the elevated portion of the cam passes over the follower roller 25. As soon as the recessed portion 24 comes opposite the follower roller 25, the toggle 31—32 will collapse with the result that the pressure elements 44 will be elevated from the hand momentarily releasing the pressure.

The return movement of the pressure faces 44 will be assisted by the spring 55 which extends between the arm 27 and the ceiling 12 of the casing 10 and by the springs 42 which encircle the

rod elements 39 carrying the pressure elements 44.

The throw of the toggle 31—32 and the amount of the pressure applied by the sponge rubber element to the hand 52 may be controlled by turning the adjusting nut 36 in its bearing opening 35 on the top of the casing at 12 which would cause an elevation or lowering of the toggle and if desired, this adjustment may be made while the machine is operating.

The time of treatment may be conveniently controlled by the clock 56 and if desired, a connection between the clock and the electrical circuit may be made so as to cut off the motor and the heat when the desired amount of treatment has taken place.

Several treatments of the character may be carried out with the glove 51 of Figure 5 either being impregnated with new material or a new glove being utilized. If desired, the bracket 41 might be made swinging so that the pressure of the faces 44 would also have a lateral movement in addition to the downward pressure movement, increasing the therapeutic effect.

In the preferred form, as shown in Figures 1 to 3, the domed pad 45 may extend over the entire bottom of the enclosure 10 and it will be noted at 57 that it is flush with the funnel-like or cup-like openings 46 where the hands are inserted.

By changing the cam 23 it is possible to regulate the character of pressure which is applied to the hand.

The device of Figure 4 is portable as contrasted to the stationary device of Figures 1 and 3 and in this portable device a handle 58 is provided which is pivotally or fixedly connected at 59 to the motor housing 60 which is provided with an electrical conduit connection 61.

The electrical motor 60 is provided with a gear reduction box 62 and an enclosure or bracket 63 in which is received the rotating cam or oscillator member 64.

Contacting with the cam or oscillating member 64 is the follower roller 65 carried on the clevis 66, said clevis being connected to the rod 67 which is attached to the plate 68 carrying the rubber pad 69.

The return spring 70 causes a return of the rod 67 when the roller passes into the recess of the cam 64. The enclosure 71 may be detachable and adjustably connected to the bracket 63 by the thumb screws 72 and a suitable base 73 may be provided. The enclosure 71 will either be heated by resistance coils inside said closure or placed below or within the base 73.

The pad 69 may be caused to partake of both a vertical and sidewise movement so as to give alternate pressure and lateral massaging movement to the hand, and if desired, the interior of the enclosure 71 may be provided with electrical resistance elements, to cause a heating of the hand itself or encased in the glove 51 while undergoing treatment.

It will thus be seen that the present applicant has provided a compact, inexpensive and durable apparatus either to be utilized in fixed position on a treating table or to be transported from place to place by which a controlled manipulation of the extremities, such as the hands may be obtained in the presence of suitable medicaments and at a constant and uniform temperature substantially above atmospheric.

The present applicant is a continuation in part of my copending application Ser. No. 745,901 filed Sept. 28, 1934.



It is to be understood that many changes and variations may be made in the apparatus without departing from the scope of the invention and at the same time including the essence thereof and it is intended to include all such variations within the scope of the present application. So, for instance, instead of subjecting the hand to intermittent applications of pressure, the apparatus may be so adjusted that in operation it will perform a rapid tapping or patting motion.

What is claimed is:

1. A process of therapeutically treating the hands which comprises enclosing the hands in a glove containing an unctuous or other medicament which is to be applied to the hand at a relatively elevated temperature and in hot condition, placing the hand enclosed in the glove in a zone of relatively constant yet elevated temperature sufficient to cause heating of the medicaments and heating of the hand and then compressing the glove and the hand at frequent intervals with an intermittent release of pressure.

2. A process of therapeutically treating the hands which comprises enclosing the hands in a glove containing an unctuous or other medicament which is to be applied to the hand at a relatively elevated temperature and in hot condition, placing the hand enclosed in the glove in a zone of relatively constant yet elevated temperature sufficient to cause heating of the medicaments and heating of the hand and then compressing the hand at frequent intervals with an intermittent release of pressure, said pressure being obtained by compressing the hand between two pliable surfaces.

3. A process of therapeutically treating the hands which comprises enclosing the hands in a glove containing an unctuous or other medicament which is to be applied to the hand at a relatively elevated temperature and in hot condition, placing the hand enclosed in the glove in a zone of relatively constant yet elevated temperature sufficient to cause heating of the medicaments and heating of the hand and then compressing the hand at frequent intervals with an intermittent release of pressure, the periods of pressure application being substantially longer than the release periods.

4. A device of the character described, comprising a receptacle having a side opening for the insertion of a limb, a pad in said receptacle, a sponge, a carrier for said sponge disposed horizontally over the pad, slideways extending vertically in said receptacle, and means for actuating said carrier, said means including a motor, a worm driven by said motor, a cam driven by said worm and a toggle actuated by said cam.

5. A device of the character described comprising a receptacle having a side opening for the insertion of a limb, a pad in said receptacle, a carrier slidable vertically in said receptacle over the pad towards and away from the pad, means to

guide sliding movement of the carrier and prevent oscillation thereof, a pliable cushion carried by said carrier in facing relation to said pad and means for reciprocating the carrier towards and away from the pad and causing the cushion to have tamping contact with a limb inserted through the side opening and resting upon the cushion under the pad.

6. A device of the character described comprising a receptacle having a bottom, side and end walls and a cover, an opening being formed in a side wall for insertion of a limb into the receptacle and the cover having an opening formed therein, a pad in said receptacle upon the bottom, a carrier frame in the receptacle extending from its ends and engaging rails to slidably mount the frame for vertical movement towards and away from the pad, a soft cushion seated in said frame and projecting therefrom towards the pad, and means for actuating said carrier, said means including a motor, a worm driven by said motor, a cam driven by said worm and a toggle actuated by said cam.

7. A device of the character described comprising a receptacle having an opening for the insertion of a limb, a resilient pliable member mounted for vertical sliding movement in the upper portion of said receptacle above the plane of the opening, an elastic limb-supporting pad at the bottom of the receptacle below the opening and in alignment with the pliable member, and means for moving the pliable member towards and away from said pad for acting upon a limb resting upon the pad between the pad and pliable member.

8. A therapeutic apparatus comprising a casing, means permitting the selection of desired elevated atmospheric temperatures within the casing, means enabling the hands to be located within the casing, reciprocating pressure members to intermittently apply pressure to the hands while in said casing and while being maintained at said elevated temperature and means to actuate said pressure members, said last mentioned means including a motor, a worm driven by said motor, a cam driven by said worm, a toggle actuated by said cam, a carrier frame for said pressure members actuated by said toggle and return springs associated with said carrier.

9. A therapeutic apparatus comprising a casing, means to maintain a desired elevated atmospheric temperature within the casing, means enabling the hands to be located within the casing, reciprocating pressure members to intermittently apply pressure to the hands while in said casing and while being maintained at said elevated temperature, and means to actuate said pressure members, said hand locating means including pliable embossments to fit the cups of the hands on the floor of the casing.

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